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The invention relates to an electrolysis plant for the extractive metallurgy, with an electrolyte container to the uptake of an electrolyte bath, with two bus bars from metal with terminals to a direct current source, with several, as cathodes or anodes serving electrodes from metal, arranged at the edge of the container, whereby each electrode exhibits an horizontal support ranging and an electrode area diving in into the electrolyte bath and whereby the electrodes rest upon with the electrolysis enterprise with their support ranging in the range of a tangential contact for current transmission on one of the bus bars.

Electrolysis plants of this type are from the US patent 4,035,280 and 121,509 known from EP-A-0. Here the support ranging exhibits V-shaped notches, whose straight outer edges in the range of a tangential contact on frustoconical surfaces of the bus bar rest upon. Thus each tangential contact exhibits four contact points, at those the current conduction made.

From the US patent 2443112 are bus bars known, which are tooth shaped like a bar formed with notches to the uptake of support ranging.

The invention is the basis the object to create one also for high currents suitable tangential contact between bus bar and support ranging. Simultaneous ones should be the components simple necessary for it producible and wear resistant. This succeeds according to invention with the electrolysis plant initially specified thus that the tangential contact between the support ranging and the associated bus bar with at least unite the electrodes along at least a straight, horizontal line of contact made, whose length amounts to 10 to 500 mm that one of the two affecting metal surfaces forms an angle  $x$ , measured against the horizontal, from 30 to 80 DEG that the width of the tangential contact, vertical measured to the line of contact, amounts to 0.2 to 4 mm, and that the line of contact parallel runs to longitudinal axis the bus bar.

The tangential contact according to invention is so formed that along the horizontal line of contact not only a vertical but also an horizontal force component work. Thus the transition resistance for the current flow becomes minimized, even if in the contact area disturbing coatings can form. In particular if the electrolysis plant with high currents becomes operated, the length of a line of contact will amount to at least 20 mm. The formation according to invention of the contact surface can take place for the cathodes and/or the anodes, it is advisable, not only some, to accordingly train but all tangential contacts.

An arrangement possibility of the tangential contacts consists of the fact that at least a bus bar is rinnenförmig formed with at least an oblique wall and that the lines of contact of the associated electrodes run along the oblique wall. A rinnenförmige bus bar is simple producible, simultaneous can the gutter leading cooling liquid and/or cleaning fluid used become. It can be advisable to train at least a bus bar rinnenförmig with two oblique walls so that a support ranging on the bus bar pushes away along two lines of contact.

A simple variant consists of the fact that at least a bus bar is as horizontal bar with a supporting edge formed that the container on that exhibits the bus bar opposite edge at least an electroless counterstay and that at least one of the support ranging exhibits a currentconductive head with oblique contact surface, that with the electrolysis enterprise the supporting edge touched. Also here the inclined surface forms against the horizontal an angle  $x$  from 30 to 80 DEG.

Arrangement possibilities of the electrolysis plant become explained with the help of the drawing. It shows:

Fig. 1 an electrolysis plant in more isometric, schematic representation,

Fig. 2 a section after the line II-II by the plant of the Fig. 1,

Fig. 3 cooperation of a support ranging with a bus bar in opposite Fig. 2 enlarged representation,

Fig. 4 a modified version of the Fig. 3,

Fig. 5 an other variant with gutter-like bus bar in to Fig. 2 analogous representation and,

Fig. 6 a variant with a bus bar with rectangular cross section in to Fig. 2 analogous representation.

The electrolysis container (1) the Fig. 1 exhibits an inlet (2) for the electrolytes and a flow (3). In the electrolysis enterprise one behind the other alternate numerous cathodes and anodes hang in the container (1) in the not represented electrolyte bath, whereby in Fig. 1 of better clarity because of only a cathode (4) and an anode (5) shown is. The power supply made over bus bars (6) and (7), whereby the electrodes with their support ranging (8) on the associated rail rest upon and the current conduction in the contact area made. To the cathode (4) an electroless support rail (16) belongs and to the anode (5) the electroless support rail (17) belongs. The rails are attached with the edges of the container (1), as in Fig. 1 and 2 shown is.

Each support ranging (8) supports itself on the one hand on the associated bus bar (6) and the opposite, associated support rail (16) off, also Fig compares. 2. With each support ranging (8) an electrode area (9) is conductive connected, on which itself in case of the cathode the metal which can be won, z. B. Copper, zinc, nickel or cobalt separate.

As clearest from Fig. 3, exhibits the support ranging (8) at an end a quaderförmigen metal block (8b) comes out, is electrical conductive connected with which it. The block (8b), which also "head" mentioned becomes here, can z. B. from coppers or a copper alloy made its, so that it leads the current good. The block (8b) sits in the bus bar (6), which exhibits a prolonged-longitudinal gutter (11) with oblique walls (11a) and (11b) as well as a bottom (11c). Against the horizontal form the walls (11a) and (11b) an angle ( $x$ ) from 30 to 80 DEG. The block (8b) touched with its lower, horizontal edges (12a) and (12b) in each case one the oblique walls (11a) and (11b) along an horizontal, straight line (line of contact), whose length is certain by the measures of the block. The contact-line-prolonged is appropriate for at least 20 mm within the range of 10 to 500 mm and preferably amounts to it. The width of the tangential contact along the line of contact, vertical to the line of contact measured, is a relative small and lies within the range of 0,2 to 4 mm. By the weight of the electrode this contact-wide comes off, because the edges (12a) and (12b) not ideal are sharp edged and itself a little into the walls (11a) and (11b) the bus bar (6) imprint. The bus bar consists usually of coppers or a copper alloy, so that it leads the current sufficient good with sufficient strength. For increasing the strength of the rail can the copper z. B. Zirconium added its.

The gutter (11) can serve also for the uptake a cool or a cleaning fluid. For this purpose it can be useful to provide the bottom (11c) of the gutter with eingetieften grooves (14) as in Fig. 3 shown is. These grooves (14) provide for one if possible even distribution of the liquid over the bottom (11c), but are not them necessarily required, in order to lead a liquid by the gutter (11).

With the variant of the Fig. 4 is the contact head (8b) not with angular edges, but with cylinder-like rounded off surfaces (12c) and (12d) formed, which affect the walls (11a) and (11b) the rail (6) along horizontal lines of contact. The affecting surface along the lines becomes thereby opposite the angular edges (12a) and (12b) the Fig. 3 something broadened.

If each electrode and their associated support ranging (8) take over the current of a Stromschiene

only along a single line of contact, arrangement possibilities offer themselves, like them in Fig. 5 and Fig. 6 shown are. In accordance with Fig. 5 the touched contact head (8b) of the support ranging (8) only the oblique wall (11a) along an horizontal line of contact. The bus bar (6) and also the bus bar (7) is also here as gutter formed, by which one can lead liquid to cleaning and/or cool one. By the stop (8a) the support ranging on the support rail (16) becomes sufficient supported and maintained, so that the electrode is in the container (1) fixed.

In accordance with Fig. the support ranging (8) exhibits 6 a contact head (18) with a downward directed oblique support surface (18a). This support surface a touched upper longitudinal edge of the bus bar (7), formed as bar, whereby likewise again an horizontal line of contact results. On the opposite side the support ranging supports itself likewise with an inclined surface (18b) against the support rail (17). In all other respects the electrolysis arrangement is the same as already together with Fig. 1 explained. It is apparent that the edge of the bus bar, whatever can be the contact head touched, more or less rounded.